Directed differentiation of human pluripotent stem cells along the pancreatic endocrine lineage.

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Public Summary:

Scientific Abstract:
Many research groups are engaged in using human pluripotent stem cells (hPSCs) to generate surrogate pancreatic beta-cells for transplantation into diabetic patients. However, to our knowledge, there is no report on the successful generation of glucose-responsive insulin-producing beta-cells from hPSCs in vitro. Below, we outline a method that is based on published protocols as well as our own experience by which one can differentiate hPSCs along the pancreatic lineage to generate insulin-producing beta-cell-like cells. The protocol, which spans five distinct stages, is an attempt to recapitulate the derivation of pancreatic beta-cells in vitro as they form in the developing embryo. We included details on materials and techniques, suggest ways to customize it to your hPSC line of choice, added notes on how to monitor and analyze the cells during differentiation, and indicate what results can be expected.